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This is an absolutely accurate statement. 0 is the absolute zero and not an *infinitesimal.* In like manner $5 \div 0 = \infty$ is an abbreviated and inaccurate expression for the following: 5 divided by a quantity which decreases indefinitely gives a quotient larger than any quantity however large, or briefly and *accurately* thus $\lim._{e \doteq 0}\left[\frac{5}{e}\right] = \infty$.

Discussion on a subject of this sort is trivial, but if it results in giving clearer notions of the use of 0 and ∞, a good work will have been done.

B. F. F.

BOOKS AND PERIODICALS.

Plane and Solid Analytical Geometry. By Frederick H. Bailey, A. M. (Harvard), and Frederick S. Woods, Ph. D. (Göttengen), Assistant Professors of Mathematics in the Massachusetts Institute of Technology. 8vo. Cloth, 371 pages. Boston and Chicago : Ginn & Co.

Besides the usual subjects treated in the ordinary text-books of Analytical Geometry, the following additional ones are treated with sufficient fullness to give a student a fair knowledge of them, viz: Radical Axis, and Properties of Pole and Polars. More attention should be given to these subjects in the future by the ordinary student. Besides deriving the equations of the conics in the usual way, the authors have also derived the equations by passing a plane through a right circular cone, thus emphasizing the relation of the geometrical to the analytical method of treatment. About seventy pages are given to the treatment of Solid Analytical Geometry. The treatment here is clear and concise, affording the student an excellent introduction to this important subject. B. F. F.

Famous Problems of Elementary Geometry.—The Duplication of the Cube ; The Trisection of an Angle ; and The Quadrature of the Circle. Authorized translation Vorträge Ueber Ausgewälte Fragen der Elementargeometrie Ausgearbeitet von F. Tägert. By Wooster Woodruff Beman, Professor of Mathematics in the University of Michigan, and David Eugene Smith, Professor of Mathematics in the Michigan State Normal College. 8vo. Cloth, 80 pages. Price, 55 cents. Boston and Chicago : Ginn & Co.

This book deals with the possibility of elementary geometric constructions in general, the nature of transcendental numbers, and with the transcendence of e and π. While no knowledge of the calculus is needed to read this book, the calculus not being employed in any of the discussions, yet a fair knowledge of the theory of equations and series is absolutely necessary to make it easy reading. The translators deserve the thanks of students and teachers of mathematics, and for putting out books of such scientific value at a very reasonable price, the publishers should receive encouragement by a large sale of this book.

B. F. F.

Popular Scientific Lectures. By Ernst Mach, formerly Professor of Physics in the University of Prague, now Professor of the History and Theory of Inductive Science in the University of Vienna. Translated by Thomas J. McCormack. Second Edition, Revised and Enlarged. 8vo. Cloth, 382 pages. Price, $1.00. Chicago : The Open Court Publishing Co.

These sixteen lectures on various scientific subjects are full of interest to all classes of readers. The lecture "On the Relative Educational Value of the Classics and the Mathematico-Physical Sciences" is especially interesting, and is a fair exposition of the argument *pro* and *con*.

In acquiring an education two things are requisite: first, the development of thought, and second, the power to express thought in a clear and forcible manner. The first is gained by the study of mathematics and the natural sciences, the second, by the classics. Hence, in securing the most symmetrical and stable development of the mind, it is essential that the student pursue his study in the classics, especially Latin, as well as mathematics and the natural sciences. Dr. Mach makes this very pertinent statement: "Here I may count upon assent when I say that mathematics and the natural sciences pursued alone as means of instruction yield a richer education, an education in matter and form, a more general education, an education better adapted to the needs and spirit of the times, than the philological branches pursued alone would yield." In bringing out the translation of these valuable lectures, the translator has the thanks of English readers.

B. F. F.

Field-Manual for Railroad Engineers. By J. C. Nagle, M. A., M. C. E., Professor of Civil Engineering in the Agricultural and Mechanical College of Texas. 4½x6¾ inches, Flexible Morocco, xv+394 pages. Price, $2.50. New York: John Wiley & Sons.

This book is in every way a model field-manual. It contains six chapters. Chapter I.—Reconnoisance: Chapter II.—Preliminary Surveys: Chapter III.—Location, Art. 7, Projecting Location; Art. 8, Simple Curves; Art. 9, Compound Curves; Art. 10, Track Problems: Chapter IV.—Transition Curves; Art. 11, Theory of the Transition Curve; Art. 12, Field Work; Art. 13, Transition Curve Problems: Chapter V.—Frogs and Switches; Art. 14, Turnouts; Art. 15. Crossovers: Art. 16, Crossing-Frogs and Crossing-Slips: Chapter VI.—Construction; Art. 17, Definitions, General Consideration, Vertical Curves, Elevation of Outer Rail; Art. 18, Earthworks; Art. 19, Grade and Ballast Stakes, Culverts, Bridges, and Tunnels; Art. 20, Monthly and Final Estimates.

The above abridged outline of the table of contents indicates very imperfectly the scope and character of this work. In it may be found the most essential things to be known in civil engineering discussed in a way not only that may be understood, but that can be easily understood, by any one familiar with algebra, geometry, and trigonometry.

B. F. F.

A Chapter in the History of Mathematics. An Address by Vice President W. W. Beman, Chairman of Section A, before the Section of Mathematics and Astronomy, American Association for the Advancement of Science, Detroit Meeting, August, 1897. Pamphlet, 20 pages.

In this very able address by Professor Beman is gathered together some valuable history concerning the introduction in mathematics of the square root of negative numbers. The address bears evidence of careful research, and is of great interest to all who are concerned about the progress and development of that great body of doctrine known as mathematics.

B. F. F.

Darwin and After Darwin: Part II. Post-Darwinian Questions. Heredity and Utility. 8vo. Cloth, xii and 344 pages. Price, $1.50. With portrait of Romanes. Chicago: The Open Court Publishing Co.

This, as all of Dr. Romanes' works, bears the evident marks of a profound thinker and scholar. The volume before us is chiefly devoted to a consideration of those Post-Darwinian theories which involve fundamental questions of Heredity and Utility, and contains the most valuable results of a deep study of the evolutionary problem. B. F. F.

The Probability of Hit when the Probable Error in Aim is Known with a Comparison of the Probabilities of Hit by the Method of Independent and Parallel Fires from Mortar Batteries. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. Pamphlet, 12 pages. Reprinted from the Journal of the U. S. Artillery, Vol. VIII, No. 2.

The problem considered in this paper is, To find the probability of hit on the target or deck of a ship whose area is $4aA$, where $2a$ is the width of the target in azimuth and $2A$ its length in range, a shot being fired with the intention of hitting the center. B. F. F.

Contributions to the Geometry of the Triangle. By Robert J. Aley, A. M., Professor of Mathematics in the University of Indiana. Pamphlet, 32 pages.

This thesis was accepted by the Department of Mathematics of the University of Pennsylvania in partial fulfillment of the requirements for the degree of Doctor of Philosophy, which is a sufficient testimonial of its importance and value. B. F. F.

Periodico di Mathematica Per L'Insegnamento Secondario. Dott. G. Lazzeri. November-December number.

The Mathematical Gazette. Edited by F. S. Macauley, M. A., D. Sc. October number.

Bollettino della Associazione "Mathesis" Fra Gl'Insignanti di Mathematica delle Scuole Medie.

Revue Semestrielle des Publications Mathomatiques Rédigée sous les auspices de la Sociéte Mathematique d'Amsterdam. Par P. H. Schoute, D. J. Korteweg, J. C. Kluyver, W. Kapteyn, P. Zeeman.

The American Monthly Review of Reviews. An International Illustrated Monthly Magazine. Edited by Dr. Albert Shaw. Price, $2.00 per year in advance. Single numbers, 25 cents. The American Monthly Review of Reviews Co., 13 Astor Place, New York.

The December number of the *American Monthly Review of Reviews* has several interesting features. Mr. Ernest Knaufft, editor of the *Art Student*, contributes an elaborate study of "John Gilbert and Illustration in the Victorian Era"; Dr. Clifton H. Levy tells "How the Bible Came Down to Us," with a number of reproductions from ancient Biblical manuscripts and printed texts; Lady Henry Somerset pays a tribute to the late Duchess of Teck; an English officer in the Indian service writes about the Ameer of Afghanistan; Mr. E. V. Smalley discusses Canadian reciprocity, and Mr. Alex. D. Anderson summarizes the progress of the American Republics. There is also a 23-page illustrated department devoted to the season's new books, with an introductory chapter, by Albert Shaw, on "Some American Novels and Novelists." Altogether, the *Review* is not lacking in novelty or variety. B. F. F.